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CLAIMS

[Claim(s)]
[Claim 1]A lever base material which supports a control lever tiltable by a rotating shaft provided rotatable.
A damper means which is provided in this lever base material and generates a resistance force at the time of tilting operation of said control lever.
Are the above the control lever device which it had, and said damper means, Damper cases used as an annular damper chamber in which it is located in the circumference of said rotating shaft, and is provided in a lever base material, and an inside accommodates viscous fluid, A rotary damper which consists of a rotor which is provided pivotable in these damper cases, resists viscous fluid in said damper chamber at the time of tilting operation of said control lever, and is rotated to said rotating shaft and one constituted.

[Claim 2]The control lever device according to claim 1 which becomes as composition which inserts in and forms said rotary damper in the periphery side of said rotating shaft, and fixes said damper cases to a lever base material, and as for which said rotor connects the inner circumference side with a base end or a rotating shaft of said control lever.
[Claim 3]The control lever device according to claim 1 or 2 which becomes as composition which fixes and establishes a base end of said control lever in the projecting end side of said rotating shaft which projects from a lever base material, and said rotary damper allocates between the side of a lever base material in which said rotating shaft projects, and a base end of said control lever.
[Claim 4]The control lever device according to claim 1, 2, or 3 which becomes as composition which said control lever uses and attaches said lever base material to an alcove slab of vehicles, and said rotary damper is located in the circumference of a rotating shaft, and is allocated above an alcove slab of said vehicles.
[Claim 5]Between a rotor of said rotary damper, and a base end of said control

lever, Provide an operation transfer member which rotates said rotor according to tilting operation of this control lever, and this operation transfer member, The control lever device according to claim 1, 2, 3, or 4 which it is inserted in the periphery side of said rotating shaft, and is constituted by said rotor, tubed part rotated to one, and a lever connection part which was installed outward [diameter direction] from an end of this tubed part, and was connected with a base end of said control lever.

[Claim 6]The control lever device according to claim 1, 2, 3, or 4 which provides a rotation transmitting section which makes this rotating shaft and one rotate a rotor between a rotor of said rotary damper, and a rotating shaft.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention is provided, for example in construction machinery, such as a hydraulic excavator, and relates to the control lever device used suitably to carry out switching operation of the directional control valve in a hydraulic circuit.
[0002]
[Description of the Prior Art]A run on the street is performed from a hydraulic motor being formed in a base carrier as a drive motor of the left and the right in addition to the oil hydraulic cylinder of operating, etc., and generally, construction machinery, such as a hydraulic excavator, carrying out the feeding and discarding of the pressure oil from a hydraulic power unit to these drive motors via the directional control valve for a run.
[0003]The cab which forms a cab is provided on a frame, it is located in the front side of a driver's seat in this cab, and the control lever device for a run is formed on the alcove slab at construction machinery, such as a hydraulic excavator. And by carrying out tilting operation of the control lever for a run to the back in front, an operator carries out switching control of the directional control valve for a run, and a front reverses vehicles with a drive motor.
[0004]What was considered as the composition which attaches the damper means which makes it generate a resistance force at the time of the tilting operation of a control lever in order to raise the operation feeling of an operator to such a control lever device is proposed as following.
[0005]For example, a hydraulic operation valve (henceforth the 1st conventional technology) given in JP,4-93501,U, Restriction passages, such as an orifice, are provided in the casing of an operating valve, when some hydraulic oil in a casing circulates a restriction passage at the time of the tilting operation of a control lever, it extracts, and resistance is generated, and it has composition which produces the

resistance force which opposes tilting operation by diaphragm resistance of hydraulic oil.

[0006]The pedal device (henceforth the 2nd conventional technology) of the construction machinery indicated to JP,4-53853,U, The damper which consists of hydraulic draft gears etc., for example is formed in the exterior of the remote contro valve (operating valve) operated by the control lever or a pedal, and it has composition which generates the resistance force which opposed operation of the control lever or the pedal with this damper.

[0007]The damper gear (henceforth the 3rd conventional technology) of the oil pressure pilot valve indicated to JP,7-91407,A, A control lever is provided in the upper body side of an oil pressure pilot valve tiltable via a rotating shaft, The revolving damper mechanism which becomes a position used as under surface than said rotating shaft from a tubed case and piston so that it may extend in a rotating shaft and parallel is established, a link etc. are used at the time of the tilting operation of a control lever, and the case or piston of the revolving damper mechanism is considered as a rotating shaft and the composition rotated to one.

[0008]

[Problem(s) to be Solved by the Invention]By the way, the hydraulic operation valve by the 1st conventional technology mentioned above, Since it is the composition of circulating a restriction passage, extracting internal hydraulic oil, and generating resistance, The characteristic of a damper changes with the influences of the air which viscous resistance changed with temperature changes, or internal hydraulic oil contained in hydraulic oil, etc. in many cases, and there is a problem that it is difficult to stabilize the performance as a damper.

[0009]Since it is the composition of generating the resistance force to lever handlings using dampers, such as a hydraulic draft gear, if it is in the 2nd conventional technology, It is necessary to change tilting (rocking) operation of a lever etc. into the expanding action (straight-line motion) of a damper, part mark increase by this, and there is a problem of also enlarging the whole device.

[0010]Since the revolving damper mechanism is used for the 3rd conventional technology and members changed into a straight-line motion are considered as the composition which provides a revolving damper mechanism in the position caudad estranged from the rotating shaft which supports the control lever of an unnecessary thing on the other hand, The space in which a revolving damper mechanism is accommodated is needed, the whole device is enlarged by this, and there is a problem that it is difficult to attain small size and a weight saving.

[0011]Since the revolving damper mechanism is caudad allocated rather than the rotating shaft which supports a control lever, a revolving damper mechanism will be arranged in the under floor below the alcove slab of a cab with which a control lever device is attached, for example. For this reason, it will be necessary to perform

maintenance of a revolving damper mechanism, inspection work, etc. with the alcove slab down side, and there is a problem that maintenance nature falls.
[0012]It is necessary to use an arm etc. in this case as a connecting tool which tells a motion of a control lever to a revolving damper mechanism, and the arm insert hole for inserting this arm in the alcove slab of a cab with a crevice rockable is formed. For this reason, the boots made of rubber, etc. will need to close the arm insert hole drilled in the alcove slab, it will be necessary to suppress invasion of dust etc., part mark increase by this, and there is a problem of the workability at the time of an assembly falling.
[0013]This invention was made in view of the problem of the conventional technology mentioned above, and the purpose of this invention, A resistance force is generated with the rotary damper allocated in the circumference of a rotating shaft, and the operation feeling of an operator can be improved, and the small size of a device and a weight saving can be attained and it is in providing the control lever device which enabled it for maintenance nature etc. to improve.
[0014]
[Means for Solving the Problem]In order to solve a technical problem mentioned above, this invention is applied to a control lever device provided with a lever base material which supports a control lever tiltable by a rotating shaft provided rotatable, and a damper means which is provided in this lever base material and generates a resistance force at the time of tilting operation of said control lever.
[0015]And the feature of composition of that an invention of claim 1 adopts, Damper cases used as an annular damper chamber in which it is located in the circumference of said rotating shaft, said damper means is provided in a lever base material, and an inside accommodates viscous fluid, It is in having constituted with a rotary damper which consists of a rotor which is provided pivotable in these damper cases, resists viscous fluid in said damper chamber at the time of tilting operation of said control lever, and is rotated to said rotating shaft and one.
[0016]Since a rotor of a rotary damper will resist viscous fluid in a damper chamber and it will rotate to a rotating shaft and one if a rotating shaft rotates to one way by constituting in this way according to tilting operation of a control lever, A resistance force by viscous fluid gets across to a control lever as reaction force, and a good operation feeling can be given to an operator.
[0017]According to the invention of claim 2, a rotary damper is inserted in and formed in the periphery side of a rotating shaft, damper cases are fixed to a lever base material, and a rotor is considered as composition which connects the inner circumference side with a base end or a rotating shaft of a control lever. Thereby, a rotary damper can be inserted in the periphery side of a rotating shaft, can fix the damper-cases side to a lever base material, and can connect the inner circumference side of a rotor with a base end or a rotating shaft of a control lever.

And at the time of tilting operation of a control lever, viscous fluid in a damper chamber can be resisted, a rotating shaft and one can be made to be able to rotate a rotor of a rotary damper, and a resistance force by viscous fluid can be given to the control-lever side as reaction force.

[0018]An invention of claim 3 fixes and establishes a base end of a control lever in the projecting end side of a rotating shaft which projects from a lever base material, and a rotary damper is considered as composition allocated between the side of a lever base material in which said rotating shaft projects, and a base end of said control lever. A rotary damper can be attached to the projecting end side of a rotating shaft which projects from a lever base material by this, it is not necessary to provide a mounting space special in a lever base material, and a lever base material can be formed in a compact structure.

[0019]On the other hand, according to the invention of claim 4, a control lever uses and attaches a lever base material to an alcove slab of vehicles, and a rotary damper is considered as composition which is located in the circumference of a rotating shaft and allocated above an alcove slab of said vehicles. Thereby, a rotary damper can be arranged above an alcove slab of vehicles, and maintenance of a rotary damper, inspection work, etc. can be performed easily.

[0020]An invention of claim 5 between a rotor of a rotary damper, and a base end of a control lever, Provide an operation transfer member which rotates said rotor according to tilting operation of this control lever, and this operation transfer member, It is inserted in the periphery side of a rotating shaft, and said rotor, a tubed part rotated to one, and a lever connection part which was installed outward [diameter direction] from an end of this tubed part, and was connected with a base end of said control lever constitute.

[0021]By this, if an operator carries out tilting operation of the control lever, a rotating shaft will rotate to one, and torque is told via a tubed part to a rotor from a lever connection part of an operation transfer member, viscous fluid in a damper chamber can be resisted and a rotor of a rotary damper can be rotated.

[0022]An invention of claim 6 has this rotating shaft and composition which provides a rotation transmitting section which makes one rotate a rotor between a rotor of a rotary damper, and a rotating shaft. If an operator carries out tilting operation of the control lever and a rotating shaft rotates to one by this, rotation of a rotating shaft can be told to a rotor via a rotation transmitting section, viscous fluid in a damper chamber is resisted and a rotor of a rotary damper can be rotated.

[0023]

[Embodiment of the Invention]The case where the control lever device by an embodiment of the invention is used for construction machinery, such as a hydraulic excavator, for example is hereafter mentioned as an example, and it explains in detail according to an accompanying drawing.

[0024]Here, drawing 1 thru/or drawing 5 show a 1st embodiment of this invention. One is a cab which forms a cab among a figure, and this cab 1 is formed on the revolving frame 2 of a hydraulic excavator. And on the alcove slab 1A of the cab 1, the below-mentioned driver's seat 3 and the control-lever 16 grade for a run are provided.
[0025]3 is the driver's seat which was located in the cab 1 and allocated on the alcove slab 1A, and the control lever device 4 (only one side is illustrated) of operating is formed in the left of this driver's seat 3, and the right both sides. And this control lever device 4 comprises the console box 5, a lever base material (not shown) allocated in this console box 5, and control-lever 6 grade which it was provided in this lever base material so that tilting operation was possible, and was projected from the anterior part of the console box 5 to slanting facing up.
[0026]7 is the rear cover which was located in the backside of the driver's seat 3 and was provided on the alcove slab 1A of the cab 1, and this rear cover 7 covers an air-conditioner (not shown) etc. from the upper part, for example, and raises the fine sight in the cab 1. The rear cover 7 side is equipped with Kula for saving foodstuffs etc., for example, etc.
[0027]Are located in the front side of the driver's seat 3, and 11 is the control lever device for a run attached to the alcove slab 1A of the cab 1, and this control lever device 11, It is constituted by the below-mentioned lever holder 12, the reducing valve type pilot valve 20, the control lever 16 for a run, and the rotary damper 34 grade as shown in drawing 2 thru/or drawing 4.
[0028]12 shows the lever holder which constitutes the lever base material of the control lever device 11, this lever holder 12 is formed as a block of the hollow which makes rectangular parallelepiped shape, for example using means, such as casting, and the below-mentioned pilot valve 20 is formed in the undersurface side at one. And on the alcove slab 1A of the cab 1 which serves as a clamp face as an imaginary line shows in drawing 2, a bolt (not shown) etc. are used for the lever holder 12, and it is being fixed.
[0029]As shown in drawing 3, it estranges on the left and the right and the cam seat parts 12A and 12A of the couple are formed in the inside of the lever holder 12. And the covering 13 is formed in the upper bed side of the lever holder 12 removable via the bolts 14 and 14 and --, and this covering 13 blockades each cam seat part 12A from the upper part.
[0030]15 and 15 are the rotating shafts of the left and the right which were provided in the lever holder 12 rotatable, the inside of the cam seat part 12A and 12A is penetrated the left and rightward, these rotating shafts 15 and 15 are prolonged, as shown in drawing 3, while counters and the end side is mutually contacted within the lever holder 12 in shaft orientations. And the end of another side projects each rotating shaft 15 from the left of the lever holder 12, and the right side, and the

below-mentioned rotary damper 34 and the control lever 16 are formed in the projecting end side.

[0031]16 and 16 are the control levers for a run of the left and the right which were provided in the projecting end side of each rotating shaft 15, and this each control lever 16, Profile composition is carried out by the lever part 16A which is prolonged down in the inside of the cab 1 in a top, and the bracket part 16B as a base end which connected this lever part 16A with the projecting end side of the rotating shaft 15. And by carrying out tilting operation of the control levers 16 and 16 of the left and the right to the back in front, the operator which took a seat to the driver's seat 3 in the cab 1 operates the below-mentioned pilot valve 20, and performs travel operation of a hydraulic excavator.

[0032]17 and 17 are the hanging pins formed in the bracket part 16B of the control lever 16, it is hanging carried out of this hanging pin 17 to the notch 39C of the operation transmission lever 39 mentioned later, and it makes the rotating shaft 15 and one rotate the operation transmission lever 39 at the time of the tilting operation of the control lever 16.

[0033]18 and 18 are the cam boards of the left and the right allocated in the cam seat part 12A of the lever holder 12, respectively, rotation stopping pin 19 grade is used for the rotating shaft 15, it is fixed to it, and this each cam board 18 rotates to the rotating shaft 15 and one. And if the rotating shaft 15 is rotated by the control lever 16, the cam board 18 will follow this and will rotate in the arrow A and the direction of A' of [in drawing 4]. At this time, the cam board 18 places the pressing operation of the below-mentioned pusher 29 upside down, and controls the operation of the pilot valve 20.

[0034]20 is a pilot valve reducing valve type [as a signal output means provided in the undersurface side of the lever holder 12], and this pilot valve 20 is constituted including the below-mentioned valve block 21, the pusher 29, 29' and the spool 30, 30', etc., as shown in drawing 4.

[0035]In the following explanation, one of these shall be accepted and explained to the member and part of a couple which are arranged in drawing 4 among each component of the pilot valve 20 at the left and the right symmetry, numerals "'" shall be attached about another side, and the explanation shall be omitted.

[0036]21 is the valve block used as the casing of the pilot valve 20, and for this valve block 21. In the top, the spring room 22 which extends down, the low pressure chamber 23 which was located in this spring room 22 bottom, and was always open for free passage in this spring room 22, the hyperbaric chamber 24 located in this low-pressure-chamber 23 bottom, and the output port 25 which was located in this hyperbaric-chamber 24 bottom, and carried out the opening to the undersurface side of the valve block 21 are formed.

[0037]As shown in drawing 3, the tank port 26 and the pump port 27 are established

in the valve block 21, and as for this pump port 27, the hyperbaric chamber 24 is connected to the hydraulic power unit (not shown) of a pilot pump etc. On the other hand, the tank port 26 is located in the pump port 27 upper part, and connects the low pressure chamber 23 and the spring room 22 to an external hydraulic oil tank (not shown) etc.

[0038]28 is tubed bushing which was located in the spring room 22 upper part, and was provided in the valve block 21, and this bushing 28 is projected towards the inside of the cam seat part 12A of the lever holder 12 from the upper bed side of the valve block 21. And the bushing 28 held the below-mentioned pusher 29 so that sliding was possible, and it has compensated that pressing operation of the pusher 29 is carried out with the cam board 18.

[0039]29 is the pusher fitted in so that sliding in the bushing 28 was possible, the upper bed side projected this pusher 29 via the bushing 28 into the cam seat part 12A of the lever holder 12, and the projecting end side is in contact with the cam board 18. And as shown in drawing 4, when it is in an initial position, the lower end side contacts the undersurface side of the bushing 28, and thereby, the pusher 29 is held to the bushing 28 at the ****** state.

[0040]30 is the spool allocated in the pusher 29 bottom via the spring receptacle 31, and in the valve block 21, this spool 30 was formed so that sliding displacement was possible, and in the top, it is prolonged down [the position of the output port 25] from the position of the spring room 22. The oil hole 30A is formed in the lower part side of the spool 30, and the low pressure chamber 23 and the hyperbaric chamber 24 are made, as for this oil hole 30A, to open the output port 25 for free passage selectively according to sliding displacement of the spool 30.

[0041]32 shows the return spring which returns the pusher 29 to an initial position, and this return spring 32 is allocated in the spring room 22, and is always energizing the pusher 29 to shaft-orientations facing up via the spring receptacle 31. And in the initial position shown in drawing 4, the return spring 32 holds the lower end side of the pusher 29 in the state where the bushing 28 was contacted.

[0042]33 showed the setting spring allocated via the spring receptacle 31 between the pusher 29 and the spool 30, and this setting spring 33 was allocated inside the return spring 32 in the spring room 22, and arranges the spool 30 with predetermined preset load to the initial position shown in drawing 4.

[0043]And when pressing operation of the pusher 29 is carried out with the cam board 18, the setting spring 33 allows the spool 30 to carry out sliding displacement downward [shaft-orientations] according to this pressing operation, and sets the pilot pressure generated in the output port 25 as the pressure value corresponding to the amount of pressing operation of the pusher 29.

[0044]That is, when the spool 30 carries out sliding displacement caudad according to the pressing operation of the pusher 29 and the output port 25 is open for free

passage to the hyperbaric chamber 24 by the oil hole 30A, the inside of the output port 25 will be in a high pressure condition, and this pressure turns into reaction force and acts on the undersurface of the spool 30. And the spool 30 resists the setting spring 33 according to this reaction force, and it is pressed upward, and flexure deformation of the setting spring 33 is carried out so that the low pressure chamber 23 or the hyperbaric chamber 24 may be made to open the output port 25 for free passage.

[0045]For this reason, making the spring load at that time, and the pressure in the output port 25 balance, it carries out sliding displacement of the spool 30 in the bottom upwards, and the setting spring 33 sets up the pressure in the output port 25 suitably.

[0046]In this case, the output port 25 (25') of the pilot valve 20 is connected to the hydraulic pilot part of the directional control valve for a run provided in the middle of the main circuit via pilot pipings (neither is illustrated). And according to the pilot pressure outputted from the output port 25 (25') of the pilot valve 20, switching operation of the directional control valve for a run is carried out, and it controls to variable the flow etc. of the pressure oil which carries out feeding and discarding to the hydraulic motor for a run (not shown).

[0047]At the time of the tilting operation of the control lever 16, 34 and 34 are a resistance force the rotary dampers as a damper means to generate, and this rotary damper 34, It is constituted by the below-mentioned damper cases 35 and the rotor 38, and is inserted in and provided in the projecting end periphery side of the rotating shaft 15 which projects from the side of the lever holder 12 as shown in drawing 3.

[0048]35 is damper cases of the rotary damper 34, and these damper cases 35, As shown in drawing 5, it is formed by attaching the annular 1 side shell 35A and the other side shell 35B of each other, and between this 1 side shell 35A and the other side shell 35B, the annular ring 35C with the stage for forming the damper chamber 36 inside is fixed and formed. And the damper cases 35 are formed as a short length annular case with an axial dimension short as a whole.

[0049]Here, the damper cases 35 have a crevice in the projecting end side periphery of the rotating shaft 15, are inserted in, and are allocated between the side of the lever holder 12, and the bracket part 16B of the control lever 16. And in the damper cases 35, the viscous fluid R, such as viscoelasticity material which constructed the bridge in high viscosity oil, such as a silicone oil, and a rubber material, is accommodated so that the annular damper chamber 36 may be filled.

[0050]The fitting parts 35D and 35D of the couple which projects outward [diameter direction] as shown in drawing 2 at the periphery side of the damper cases 35 are formed in the shell 35A and 35B and one, for example. And the damper cases 35 are attached to the lever holder 12 at one by fixing each fitting part 35D to

the side of the lever holder 12 using bolt 37 grade.
[0051]38 is the rotor provided pivotable in the damper cases 35, and a diameter direction inside part projects this rotor 38 from the inner circumference side of the damper cases 35 to a diameter direction, and it is [are provided by its short length cylinder part 38A, and] in the projection part. And the cylinder part 38A of the rotor 38 has a crevice, is inserted in the periphery side of the rotating shaft 15, and rotates to the boss section 39A and one by connecting with the boss section 39A of the operation transmission lever 39 mentioned later, for example by spline combining, welding, or other means.
[0052]39 is the tilting operation of the control lever 16 an operation transmission lever as an operation transfer member transmitted to the rotor 38, and this operation transmission lever 39, The boss section 39A as a tubed part which was inserted in the periphery side of the rotating shaft 15 as shown in drawing 5, and was connected with the cylinder part 38A of the rotor 38 at one, Axial ends of this boss section 39A are consisted of by the lever connection part 39B installed outward [diameter direction] along with the bracket part 16B of the control lever 16.
[0053]As shown in drawing 2, the abbreviated U character-like notch 39C is formed in the tip side of the lever connection part 39B, and it is hanging carried out of the projecting end side of the hanging pin 17 which projects in shaft orientations from the bracket part 16B to this notch 39C. And at the time of the tilting operation of the control lever 16, the operation transmission lever 39 rotates the rotating shaft 15 as a center, and this rotation is told to the rotor 38 of the rotary damper 34 via the boss section 39A of the operation transmission lever 39.
[0054]Thereby, the viscous fluid R of the damper chamber 36 is resisted within the damper cases 35, it rotates to the rotating shaft 15 and one, and the rotor 38 of the rotary damper 34 makes the viscous fluid R generate a resistance force within the damper chamber 36. And the resistance force at this time turns into reaction force, and gets across to the control lever 16, and the operation feeling of the size corresponding to reaction force is given to the operator of the control lever 16.
[0055]The control lever device 11 for a run by this embodiment has the composition like ****, and explains the operation below.
[0056]First, if tilting operation of the control lever 16 is carried out, for example in the direction of arrow A in order for the operator which took a seat to the driver's seat 3 in the cab 1 to make it run vehicles, Pressing operation of the pusher 29 of the pilot valve 20 shown in drawing 4 is carried out downward [shaft-orientations] with the cam board 18, and the spool 30 carries out sliding displacement downward [shaft-orientations] via the setting spring 33 according to the control input at this time.
[0057]Thereby, the spool 30 intercepts the low pressure chamber 23 from the

output port 25 by the oil hole 30A, and opens the hyperbaric chamber 24 for free passage to the output port 25. And the pressure generated in the output port 25 side at this time acts on the undersurface side of the spool 30 as a feedback pressure, and comes to make the spool 30 shaft-orientations facing up, and the setting spring 33 is compressed from a preset state, and bends.

[0058]As a result, sliding displacement is repeated on shaft orientations and to the bottom, the spring load of the setting spring 33 is set up according to the amount of pressing operation of the pusher 29, and, as for the spool 30, the pilot pressure corresponding to this spring load is supplied to the directional control valve for a run via pilot pipings from the output port 25. And the feeding and discarding of the pressure oil of the flow corresponding to the amount of switching operation of the directional control valve are carried out to the hydraulic motor for a run, and the running drive of the vehicles is carried out.

[0059]When an operator carries out tilting operation of the control lever 16, here, The operation transmission lever 39 connected with the bracket part 16B of the control lever 16 via the hanging pin 17 rotates the rotating shaft 15 as a center, and this rotation is told to the rotor 38 of the rotary damper 34 via the boss section 39A of the operation transmission lever 39.

[0060]For this reason, the rotor 38 resists the viscous fluid R within the damper cases 35, it rotates to the rotating shaft 15 and one, and the resistance force by the viscous fluid R generates the rotary damper 34 within the damper chamber 36 in the direction which controls rotation of the rotor 38. And the resistance force at this time turns into reaction force, and gets across to the control lever 16, and a good operation feeling can be given to the operator of the control lever 16 according to this reaction force.

[0061]If it is in the control lever device 11 for a run especially, In order for the control lever 16 for a run to project with a comparatively long size on the alcove slab 1A as shown also in drawing 1, and for an operator to grasp the projecting end (upper bed) side of the control lever 16 and to perform tilting operation, unless said reaction force is enlarged fairly, it is difficult to keep an operation feeling good.

[0062]So, in this embodiment, the rotary damper 34 is inserted in and formed in the projecting end side of the rotating shaft 15 which projects from the lever holder 12 of the control lever device 11, and it has composition which allocates this rotary damper 34 between the side of the lever holder 12, and the bracket part 16B of the control lever 16.

[0063]And fix the damper cases 35 of the rotary damper 34 to the lever holder 12 using bolt 37 grade, and in the annular damper chamber 36 formed in the damper cases 35. The viscous fluid R which consists of high viscosity oil etc. was accommodated, and the rotor 38 which resists the viscous fluid R and is rotated is formed in the damper chamber 36. Between the rotor 38 of the rotary damper 34,

and the control lever 16, the operation transmission lever 39 which transmits the tilting operation of the control lever 16 to the rotor 38 is formed, and the rotor 38 is considered as the rotating shaft 15 and the composition which one is made to rotate.

[0064]For this reason, at the time of the tilting operation of the control lever 16, the rotor 38 of the rotary damper 34 can be rotated to the rotating shaft 15 and one by the operation transmission lever 39, and the rotational resistance by the viscous fluid R can be given as rotary reaction big enough to the rotor 38 within the damper cases 35.

[0065]Thereby, the operator which grasped the tip side of the control lever 16 withir the cab 1 can receive the reaction force accompanying tilting operation as a resistance force by the viscous fluid R in the rotary damper 34, and can keep an operation feeling good. With the hydraulic oil in the pilot valve 20, the viscous fluid R such as high viscosity oil enclosed in the damper cases 35, can adopt the oil of another kind, stabilizes the performance as a damper, and can improve reliability.

[0066]Since the rotary damper 34 is considered as the composition which is located in the exterior of the lever holder 12, and is inserted in and provided in the periphery side of the rotating shaft 15, it is not necessary to form specially the mounting space for forming the rotary damper 34 to the inside of the lever holder 12. And it can respond only by forming the projecting end side of the rotating shaft 15 for a long time by the thickness (height measurement) of the rotary damper 34, lever holder 12 grade can be formed compactly, and the small size of the whole device and a weight saving can be attained.

[0067]The lever holder 12 which supported the control lever 16 rotatable via the rotating shaft 15, Since it has composition which attaches on the alcove slab 1A of the cab 1, and also arranges the rotary damper 34 to the alcove slab 1A up side around the rotating shaft 15, maintenance of revolving damper 34 grade and inspection work can be performed, for example with the alcove slab 1A up side, and maintenance nature can be improved.

[0068]Therefore, in this embodiment, a resistance force is generated with the rotary damper 34 allocated in the circumference of the rotating shaft 15, and the operation feeling of an operator can be kept good. And the small size of the control lever device 11 and a weight saving can be attained, and the maintenance nature of rotary damper 34 grade can be improved.

[0069]Next, drawing 6 thru/or drawing 8 show a 2nd embodiment of this invention, and there is the feature of this embodiment in having had this rotating shaft and composition which provides the rotation transmitting section which makes one rotate a rotor between the rotor of a rotary damper, and the rotating shaft. In this embodiment, the same numerals shall be given to the same component as a 1st embodiment mentioned above, and the explanation shall be omitted.

[0070]41 and 41 are the rotating shafts provided in the lever holder 12 rotatable among a figure, and although this each rotating shaft 41 is constituted like the rotating shaft 15 described by a 1st embodiment, the male spline 41A is formed in the periphery side of the projecting end in which the rotating shaft 41 projects from the lever holder 12. And this male spline 41A constitutes the rotation transmitting section with the female spline 45B of the rotor 45 mentioned later.
[0071]42 and 42 are the rotary dampers as a damper means which generates a resistance force at the time of the tilting operation of the control lever 16, and this rotary damper 42 is constituted by the damper cases 43 and the rotor 45 like the rotary damper 34 described by a 1st embodiment. And it is constituted by the 1 side shell 43A, the other side shell 43B, the ring 43C with [annular] the stage, the fitting parts 43D and 43D, etc., and, as for the damper cases 43 of the rotary damper 42, the damper chamber 44 which accommodated the viscous fluid R, such as high viscosity oil and viscoelasticity material, is formed by the inside.
[0072]Although the rotor 45 provided pivotable in the damper cases 43 has the short length cylinder part 45A into the portion which projects in the diameter direction inside from the inner circumference side of the damper cases 43, the female spline 45B as a rotation transmitting section is formed in the inner circumference side of this cylinder part 45A.
[0073]And the female spline 45B of the rotor 45 gears to the male spline 41A of the rotating shaft 41, as shown in drawing 7 and drawing 8, and the rotor 45 of the rotary damper 42 is really pivotable, and is connected with shaft orientations by this at the projecting end side of the rotating shaft 41 so that relative displacement is possible.
[0074]This embodiment constituted in this way can also obtain the almost same operation effect as said 1st embodiment. However, in this embodiment, since spline combining of the rotor 45 of the rotary damper 42 is directly carried out to the rotating shaft 41, the operation transmission lever 39 grade described by a 1st embodiment can be made unnecessary, part mark are reduced, and the workability at the time of an assembly can be improved.
[0075]Although the pilot valve 20 was formed in the undersurface side of the lever holder 12, and the case where pilot pressure was outputted from the output port 25 of this pilot valve 20 was mentioned as the example and explained by said each embodiment, This invention is good also as composition which forms not only this but the displacement sensor which detects the amount of tilting operation of the control lever 16, for example in the lever base material of lever holder 12 grade, for example as a signal output means.
[0076]Although the case where the rotary damper 34 (42) was attached to the control lever device 11 for a run was mentioned as the example and said each embodiment explained it, this invention is good also as composition which attaches a

rotary damper etc. to the control lever device 4 grade of not only this but operating shown, for example in drawing 1.
[0077]
[Effect of the Invention]According to the invention according to claim 1, the damper means which makes the tilting operation of a control lever generate a resistance force as explained in full detail above, The damper cases used as the annular damper chamber in which it is located in the circumference of a rotating shaft, and is provided in a lever base material, and an inside accommodates viscous fluid, Since the rotary damper which consists of a rotor which it is provided pivotable in these damper cases, and is rotated to a rotating shaft and one constitutes, at the time of the tilting operation of a control lever. The viscous fluid in a damper chamber can be resisted, the rotor of a rotary damper can be rotated to a rotating shaft and one, and the operation feeling of an operator can be raised by making the resistance force by viscous fluid into reaction force. A rotary damper can be compactly allocated in the circumference of a rotating shaft, and the small size of a device and a weight saving can be attained.
[0078]Since according to the invention according to claim 2 a rotary damper fixes to a lever base material, and provides damper cases by the periphery side of a rotating shaft and the rotor is considered as the composition which connects the inner circumference side with the base end or rotating shaft of a control lever, A rotary damper can be stabilized and allocated in the circumference of a rotating shaft, and a rotor can be rotated to a control lever or a rotating shaft, and one within the damper cases fixed to the lever base material. Thereby, at the time of the tilting operation of a control lever, the viscous fluid in a damper chamber can be resisted, a rotating shaft and one can be made to be able to rotate the rotor of a rotary damper, and the resistance force by viscous fluid can be given to the control-lever side as reaction force.
[0079]The invention according to claim 3 fixes and establishes the base end of a control lever in the projecting end side of the rotating shaft which projects from a lever base material, Since the rotary damper is considered as the composition allocated between the side of a lever base material in which said rotating shaft projects, and the base end of said control lever, it becomes unnecessary to be able to attach a rotary damper to the projecting end side of the rotating shaft which projects from a lever base material, and to provide a mounting space special in a lever base material. And it can respond only by extending a rotating shaft to shaft orientations by the thickness of a rotary damper, and a lever base material can be formed in a compact structure.
[0080]On the other hand, since the rotary damper is considered as the composition allocated above the alcove slab of the vehicles with which it is located in the circumference of a rotating shaft, and a lever base material is attached according to

the invention according to claim 4, Maintenance of a revolving damper etc. and inspection work can be efficiently performed in the position above the alcove slab of the vehicles used as the clamp face of a lever base material, and the maintenance of a device can be improved.

[0081]Since the invention of claim 5 has composition which provides the operation transfer member which rotates a rotor according to the tilting operation of this control lever between the rotor of a rotary damper, and the base end of a control lever, By following the tilting operation of a control lever, being able to rotate a rotor to a rotating shaft and one, resisting the viscous fluid in a damper chamber, and rotating a rotor, reaction force of manipulation is generated and a good operation feeling can be given to an operator.

[0082]Since the invention according to claim 6 has this rotating shaft and composition which provides the rotation transmitting section which makes one rotate a rotor between the rotor of a rotary damper, and the rotating shaft, If an operator carries out tilting operation of the control lever and a rotating shaft rotates to one, rotation of a rotating shaft can be directly told to a rotor via a rotation transmitting section, part mark are reduced, and the workability at the time of an assembly can be improved.

[Translation done.]